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ABSTRACT

Children's use of proforms in spoken descriptions of real situations was studied and compared with that of adults to explore possible developmental progressions in the use of indexical reference. A discourse distinction between situational and textual reference was applied to data from 6-year-old and 10-year-old children and from adults. Subjects described simple construction tasks to a listener who could not see the action (i.e., referential communication). The results show that the use of textual anaphoric reference increases with age. The older the speakers the more likely they were to use a noun in the discourse to which the proforms could point. The proforms can point either to just the situation, as in the case with most of the descriptions of the younger children, or to the text as well as the situation. In the latter case, the indexical anaphoric item takes part of its meaning from the object in the environment, in this case a cup or a bead, and part of its meaning from the word in the spoken text -- the word "cup" or the word "bead." The discourse reference ability of verbally pointing to another word is at another level of complexity and develops much later. The earliest devices for discourse cohesion are based on direct reference to the context, that is, indexical reference. With development, conventions of reference and cohesion become important and lead to the use of more textual anaphoric references. (SW)

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# Children's use of anaphora in discourse: A progression from situational to textual reference

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# Children's use of anaphora in discourse: A progression from situational to textual reference

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In this paper I will present an analysis of a particular kind of discourse reference--that of proforms used in spoken descriptions of real situations. There are some words in any particular language that cannot be interpreted semantically in their own right, but, instead, point or refer to something else for their interpretation. These items have been termed reference items by Halliday and Hasan in their book on Cohesion in English. Reference items are words such as pronouns "I," "it," "one;" demonstratives such as "this," "that," "here," "there;" and comparatives such as "same," "different." For purposes of clarification, these items will be termed in this paper "indexical reference words." This is to distinguish them from words that can be interpreted semantically in their own right, such as names. This latter type of reference I term "semantic reference." Indexical reference items are indexical in the sense used by Charles Peirce in his theory of signs. Indexical items have no significant resemblance to their objects, they refer to individuals or single units or single collections of units, and they direct attention to their objects rather than having specific descriptive meaning in their own right that must be interpreted. The present study is an exploratory study of the development of indexical reference. The study is exploratory in the sense that discourse

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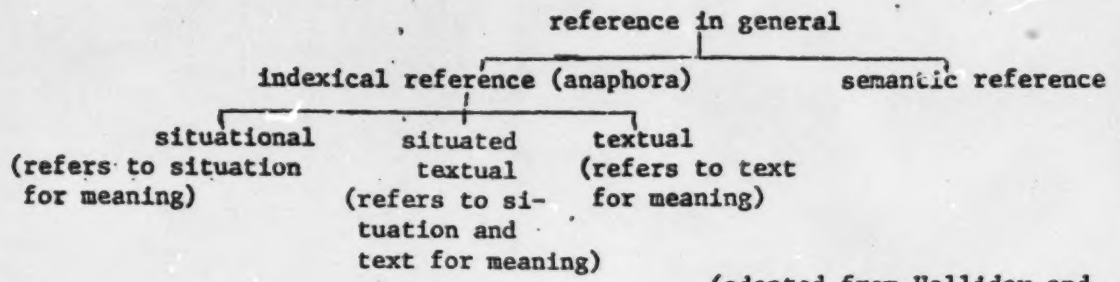
data collected in an experimental setting are used for exploring possible developmental progressions in the use of indexical reference items. Figure 1 shows the different types of reference with their definitions.

Figure 1. Types of reference


reference in general
indexical reference (anaphora)
semantic reference
situational (refers to situation for meaning)
situated textual (refers to situation and text for meaning)
textual (refers to text for meaning)

(adapted from Halliday and Hasan, Cohesion in English, 1976)

Reference in general is broken down into indexical and semantic reference. Indexical reference can be either situational, wherein the proform refers to something present in the situation, or textual, wherein the proform refers to another part of spoken or written text. A third possibility is the use of textual anaphora in the presence of the object refered to--situated textual anaphora. This type of reference is not discussed by Halliday and Hasan, but is central to the present study. Text is defined as a passage of language, either spoken or written, in which the separate utterances form a unified whole, rather than being a collection of unrelated utterances. For example, if I say "it's big" in an appropriate context, I've used situational reference. No word has been spoken that can be used to interpret "it." If I say "the chair is big, and it is comfortable," I've used textual reference--there is a word that the proform "it" can refer to. The use of profroms to refer to other words is generally termed anaphora. From a reference point of view anaphora is a general phenomenon

of verbally pointing to another element and that element can be either in the situation or in the discourse, or both.

Some authors (for example, Lyons, 1977) use the term deixis to mean essentially what I mean by situated anaphora.[1] These authors reserve the term 'anaphora' for textual anaphora. Since the word 'anaphora' is derived from the Greek meaning 'to carry back' it seems reasonable to use it for verbal elements that "carry back" to either a verbal or nonverbal element for their meaning. This system has the advantage of directly encompassing verbal and nonverbal information in the language model--a goal shared by many cognitively-oriented psycholinguists.

The reference point of view is distinct from the grammatical analysis of anaphora. The grammatical analysis, such as that of Lust and her colleagues, is quite different from the present analysis in two ways. The present study is a discourse analysis, that is, utterances that form a coherent text are analyzed in relation to each other and the processes that relate the sentences. The grammatical analysis operates at the sentence level rather than the discourse level to analyze processes within a sentence. Another difference is that in the grammatical analysis units are discussed in terms of substitution of syntactic units rather than in terms of their reference to the physical or textual environment. The present analysis is not a syntactic analysis but, rather, is a cognitive analysis of the discourse use of certain items to refer, either to situation or text.

In this study, a discourse distinction between situational and textual reference is applied to actual discourse data from children and adults in order to search for developmental progressions in the use of indexical/anaphoric reference. One might expect a progression with age from situational to textual reference. In some ways proforms refer more directly than do nouns and other forms of semantic reference items. This directness derives from the fact that proforms indicate some person or thing without either naming or describing (Peirce, 1931). They indicate anything that the speaker and hearer know or could know by calling the attention of the hearer to it.

Halliday and Hasan point out that reference to the situation might be a prior form of reference, and that reference to another item within the text is a secondary or derived form of this relation.[2] Thus, the meaning of a situational reference is something like 'the thing you see in front of you' and this is simpler in some ways than textual reference which means something like 'the thing I've just mentioned.' But the meaning in text is present in a secondary way in that prior mention using words must be

interpreted whereas pointing to an object present in the situation does not require interpretation.

There is a parallel development between lexical acquisition and the acquisition of anaphora in discourse. This parallel is related to the issue of situated reference as antecedent to textual reference. In learning words, children first point to objects (sometimes accompanying the pointing with a phonetically consistent form, cf. Carter, 1979) then point and use words like "this" or "that." Then vocabulary increases and actual nominals are used. The nominals, or nouns that refer, are first used in the context of the object or relation that is named (e.g., Nelson, 1973; Clark, 1979). Only later in development are the nominals used in the absence of the object, and, thus, are more context-free. According to the analysis presented by Gale, 1967,

> An act of pointing is an indexical sign because its object, or referent, is determined by the spatio-temporal relation between the index finger used in the act of pointing, and its object. The symbol "this" is a surrogate for an index finger in an act of pointing; its referent is determined by the existential relation between some object and the sign which is uttered or written by the speaker(p. 15).

There might be a developmental progression in later development where discourse skills are still emerging such that situated anaphora precedes situated textual anaphora, which would then precede pure textual anaphora. Indexical items are first used in discourse solely to refer to here-and-now objects. Then indexical items are used in the presence of both the object and a previous name for the object. Here the indexical item points both to the object and to the word-that-names. This is situated textual anaphora.

Situated textual anaphora would, then, theoretically, form a bridge to pure textual anaphora where an index points only to a word-that-names. This last type of anaphora is the most context free. It is the most complicated use of anaphora in two ways. Textual anaphora requires the ability to refer to objects in their absence and thus the understanding that objects are permanent. It also requires the ability to think about or reflect on objects not present in perception. At another level, textual anaphora requires the understanding that indexical items can point solely to other words for their interpretation, and these words themselves require interpretation. Thus, there are two layers of interpretation necessary in order to arrive at the referent of an item used as pure textual anaphora.

The thesis of the present paper is that processes that occur when a child is first learning how to make reference with words reoccur when the child is learning how to make reference in discourse. That is, in lexical acquisition children often have an early word form that accompanies pointing to objects and is sometimes used with an intonation that indicates they are asking the name of the object. This early form, which precedes naming, is an indexical reference form. The next step is learning names and then later using them to refer to objects that are absent. In the development of discourse reference, one might find the same steps. Within a spoken passage the child might first use situational indexical reference, just verbally "pointing" to an object present in the environment in the course of talk. Then she might use a noun to name the present object somewhere in the discourse as well as using an indexical item--thus using textual reference in the presence of the object (situated textual anaphora). Later, the object could be referred in discourse using only textual reference in the absence of the object referred to (pure textual anaphora). Using many utterances together

in a coherent way is an advanced skill and clearly requires more facility with language than the child has in the early stages of lexical development. The first steps into discourse production, however, might be characterized by some of the same context-support requirements that applied in earlier stages of language acquisition.

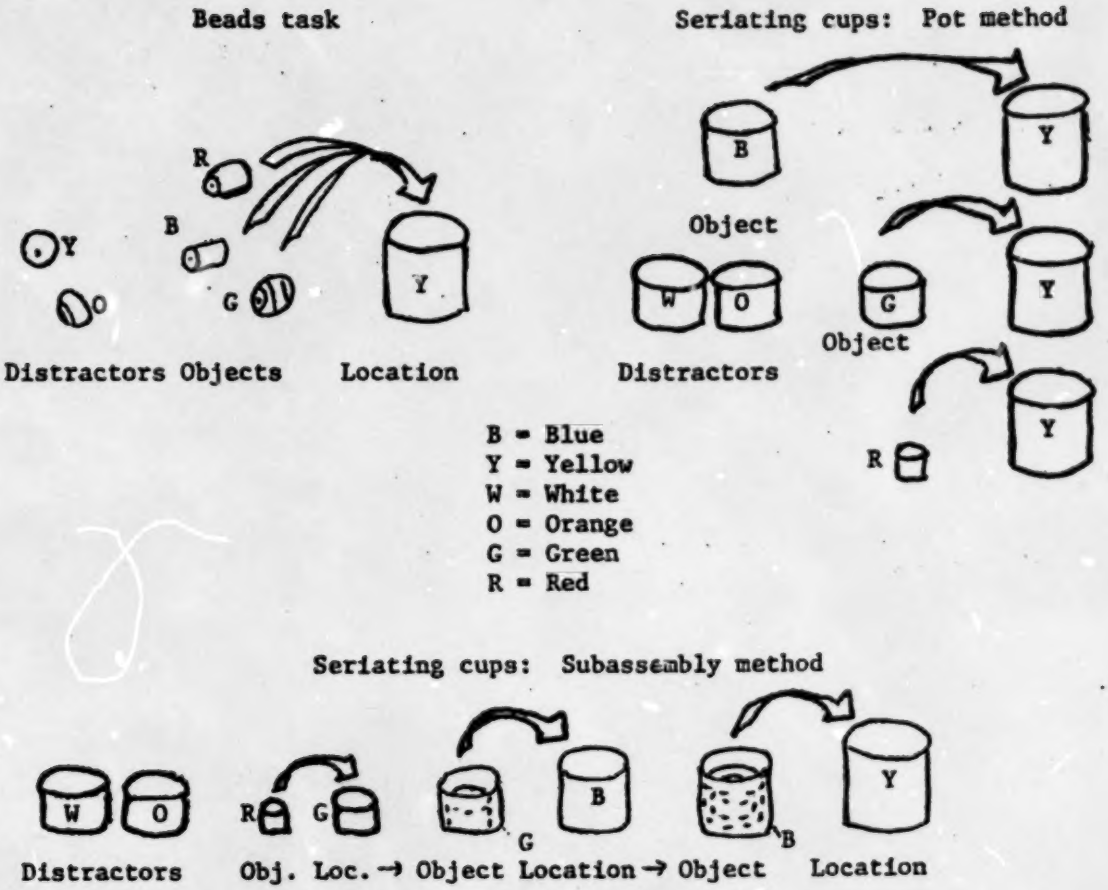
The present study addresses the issue of a progression in discourse reference from situational to situated textual reference. The end point, of textual reference not in the presence of the objects referred to, is yet to be investigated.

## Method

The data were collected with the general goal of exploring pragmatic aspects of language in an experimental setting.[3] We chose simple construction tasks and elicited language by having the subjects describe their construction to a listener who could not see the action. This is a referential communication situation, but I am not doing a communication analysis. The experimental setting was arranged to elicit language about structured tasks and is analyzed in relation to the task. All but two of the six-year-olds gave descriptions that were adequate for communication.

The tasks are shown in Figure 2. Participants were in three age groups, 6- and 10-year-olds and adults. There were 13 participants, half male and half female in each age group. Each subject described three tasks, order counterbalanced.

Figure 2. Action tasks




The general procedure was to give the subjects their materials and show them that the listener got the same materials. Then the experimenter, sitting next to the child on one side of the screen showed a completed model, modeled the action and told the subject to perform the action and describe it while they were doing the task so that the listener could build the same thing. The adults were told, in addition, that the task was

designed to be used with children and that's why it was so simple.

The simplest task was to place a certain three of five beads in a cup. Here the cup is a unique object in the setting, it is the only cup. The other two tasks involve seriated cups so that the cups are not unique and form a class. There are four cups involved in the action and two distractors. In one task the cups are combined from largest to smallest. In the second cup task the cups are combined from smallest to largest. In all of these tasks the relevant objects can be distinguished by color, shape or size. For the present analysis it's important to note that there is no communication requirement to name the objects, i.e. to refer to them with a noun.

The descriptions were audiotaped and then transcribed for content. These data are essentially procedural discourse. That is, one person is describing to another how to do something. Each task description constitutes a passage of spoken discourse; a series of utterances that form a coherent whole, a spoken text.

The transcriptions were scored for the use of proforms and whether these proforms referred only to the situation or to another part of the discourse as well as the situation.[4] The discourse data of the present study involved a state of affairs that is not considered by Halliday and Hasan. That is, in this experimental setting where the objects and actions described are always present a proform (indexical reference word) can take its meaning either from the situation alone or a part of the spoken discourse plus the situation. The present data exhibit either situational or situated textual reference. An indexical reference item can point either directly to the situation or to another part of the text as well as the situation. This combination of situational and textual is added to the possibilities

of reference diagramed in Figure 1 above.

The proforms scored were personal proforms referring to objects such as "one" and "it." Personal proforms "I" and "you" were not scored because they generally do not permit textual reference which is a central distinction in the present analysis. That is, speakers describing or conversing do not use the personal proforms "I" and "you" along with the names of the people referred to. The referent is always clear from the situation.

Other proforms scored in these data include demonstratives such as "this," "that," "then," "there." The comparatives "same" and "different" were scored. However, these were extremely rare; they only occurred once. Table 1 gives examples of both situational and situated textual reference at each age.

Table 1. Examples of descriptions.

| a. Anaphora: | Situational reference | Situated textual reference |
|---|---|---|
| | Adult, subassembly task: | Adult, pot task: |
| | "put the red one in the green one<br>the green one in the blue one<br>and the blue one in the yellow one" | "put the blue cup in the yellow one<br>the green into the blue<br>the red into the green" |
| | 10 yr. old, subassembly task: | 10 yr. old, pot task: |
| | "I'm putting the red one in the green one<br>and the green one in the blue one<br>and the blue one in the yellow one" | "I'm putting the blue cup into the yellow one<br>then I'm putting the green cup into the blue one<br>putting red cup into green one" |

Table 1 (continued)

| 6 yr. old, pot task: | 6 yr. old, textual beads task: |
|---|---|
| "the blue one in the yellow one<br>the green one in the blue one<br>the red one in the green one" | "take the green and put it into the cup<br>and then you take the red and put it in there<br>and then you take the blue" |
| | (the single communicatively adequate use of textual reference in the six year old group) |

b. No anaphora:

| 6 yr. old, beads task: | Adult, subassembly task: |
|---|---|
| "I put the blue green and red" | "Put the red cup in the green cup<br>green cup in the blue cup<br>blue cup in the yellow cup" |

c. use of "cup" in beads task vs. cups tasks:

| Adult, beads task: | Adult, pot task: |
|---|---|
| "Put the blue one in the yellow cup<br>then the red one<br>and then the green one" | "Put the blue cup in the yellow one<br>the green into the blue<br>and the red into the green" |

## Results

The use of indexical reference, that is anaphora in general, was counted in two ways. The first involves counting the number of passages that contained either situational or situated textual reference at each of the three ages. This count is given in Table 2 below. It is

Table 2. Number of passages with indexical/anaphoric reference

| Age: | 6 | 10 | Adult |
|---|---|---|---|
| Situated textual | 7 | 10 | 17 |
| Situational | 18 | 9 | 12 |

clear that the number of passages with textual reference increases with age from 7 at age 6 to 17 at the adult age. The $X^2$ ($X^2_{(1)} = 4.16$) test shows this difference to be significant at $p < .05$. The number of people using situational reference decreases slightly with age. In order to put these results in perspective it's necessary to note that there are two ways of <u>not</u> using indexical or anaphoric reference in the present discourse situation (see Table 1). One way is to use a noun each time an object or location is referred to. This happened rarely (average # of passages .66), and only in adults. The other way is to never use a proform, but just indicate the colors of the objects being used in the task. This happened more frequently than the case where each possible reference was done with a noun, and was least frequent in the adult group. At age 6 the average number of passages with no indexical reference items at all was 4.3, at age 10 it was 5.6, at the adult level it was 1.3.

The second type of tabulation is to count the number of times the speaker used an indexical item across all three task descriptions or passages. These frequencies are given in Table 3. The amount of textual

reference increases with age.

Table 3. Number of times indexical reference was used (in all three tasks)

| | Age: 6 | 10 | Adult |
|---|---|---|---|
| Textual | 5 | 29 | 77 |
| Situational | 83 | 54 | 60 |

$X^2_{(2)} = 72.65$, $p < .001$. Situational reference is more frequent in 6 year olds than in 10 year olds and adults $X^2_{(2)} = 7.13$, $p < .05$. The number of subjects at each age who used textual anaphora is given in Table 4.

Table 4. Frequency of subjects using textual reference at least once in describing all three tasks

| Age: 6 | 10 | Adult (total of 12 at each age) |
|---|---|---|
| 3 | 6 | 10 |

The older the subject group the more people who used textual anaphora at least once in any of the three passages of procedural discourse describing the tasks.

One final distinction requires discussion. Thus far the tasks have not been differentiated with respect to indexical/anaphoric reference. There is one way that the tasks differ, however, that might be important. In the beads task the cup is a unique item so that use of the word "cup" in describing this task refers to a unique item in the situation. In the other two tasks all the items are cups so the word "cup" used in describing these tasks refers to a class of objects. To look at this difference I counted the number of passages with at least one mention of "cup" separated by task and age. This count is given in Table 5. Sample passages are given

Table 5. Number of subjects who mentioned "cup" at least once

| | Age: 6 | 10 | Adult |
|---|---|---|---|
| Task: Beads | 3 | 5 | 8 |
| Cups-Pot | 1 | 3 | 7 |
| Cups-Subassembly | 2 | 3 | 7 |

in Table 1, c. Although the frequencies are low there are some discernable patterns. Again we see that the frequency of using nouns increases with age and this pattern holds true for all tasks. The increasing use of nouns, of course, allows an increasing possibility for situated textual anaphora. However, in the extreme where nouns are used in all possible slots, any anaphora is precluded. As mentioned above, this pattern was rare, and occurred only in adults. Comparing the beads task to the other two there is a tendency in the children to say "cup" more often in the beads task than the seriated cups task. They use a noun to refer to a unique object more often than to refer to a class of objects. In the beads task one can use situational anaphoric reference to the beads, (i.e., just use "one," see Table 1, c) and semantic reference to the cup, that is refer to it with the word "cup" or an equivalent noun. Thus in this task the two types of reference can be separate. There is a slight tendency for the children to use semantic reference more often when in the context of a unique object. Another characteristic of the beads task may be important in explaining the use of the word "cup." The cup is unique, but it is also combined with another set of objects from which it must be differentiated, i.e., the beads. When there are two types of objects present, semantic reference may be potentiated.

## Discussion

These results show, in several ways, that the use of textual anaphoric reference increases with age. The older the speakers the more likely they were to use a noun in the discourse to which the proforms could point. The proforms can point either to just the situation, as is the case with most of the descriptions of the younger children, or the proforms can point to the text as well as the situation. That is, in the latter case,

the indexical anaphoric item takes part of its meaning from the object in the environment, in this case a cup or a bead, and part of its meaning from the word in the spoken text--the word "cup" or the word "bead." Just as in earlier lexical acquisition verbally pointing directly to the context precedes naming the context. The discourse reference ability of verbally pointing to another word is at another level of complexity and develops much later.

Situational anaphoric reference was very frequent at all ages. This is not surprising given the here-and-now nature of the experimental situation. Indexical/anaphoric reference is a mechanism for avoiding redundancy. All age groups are proficient at using anaphora to streamline their communicative messages.

It is important to note that the use of nouns is not at all required by the communication aspects of the situation. All the objects that are moved or used as location can be specified for the purpose of communication without referring to them with nouns. Yet there is an increase with age in the use of nouns, and consequently, the way the proforms refer in the discourse. There was also a difference in the use of nouns to refer to the situation, that is, semantic reference. Nouns were used more often by the younger children in the presence of a unique object than with a class of objects.

These points lead us to two interrelated observations. The earliest devices for discourse cohesion are based on direct reference to the context, that is, indexical reference. But, with development, conventions of reference and cohesion become important and lead to the use of more textual anaphoric references. The convention is that proforms in a discourse passage require other words in the passage to point to, or reference, for their meaning. Thus with more knowledge of the language per se there

come influences beyond situated communication requirements that shape discourse. Early steps in discourse production are based on context, later steps are based on text processes.

## Footnotes

1. Lyons (1977, p. 636) defines deixis as "the function of personal and demonstrative pronouns, of tense and a variety of other grammatical and lexical features which relate utterances to the spatio-temporal coordinates of the act of utterance." Situated anaphora in which indexical items point only to an object present in the context of utterance indirectly relate the utterance to the spatio-temporal context by requiring that part of the context to be used to interpret the utterance.
2. On a parallel course to Halliday and Hasan, Lyons (1977, especially pp. 667-677) argues that deixis is more basic than textual anaphora. The gist of his argument is that textual anaphora contains a proximity factor. When one refers anaphorically to another part of the text, it must be indicated whether the part referred to is near or far. Although this argument is different from mine, we arrive at the same conclusion--that indexical reference is primary.
3. The data were collected in collaboration with Dr. Patricia Greenfield.
4. Ellipsis (or $\emptyset$ anaphors) was not scored since this does not seem to be consistent with a reference analysis. Halliday and Hasan class ellipsis as a structural rather than referential mechanism. That is, ellipsis has to do with relations between words, or groups or clauses, not with relations between meanings. I have chosen to be consistent with this analysis in my scoring of indexical items. Ellipsis is a structural mechanism available to speakers when they use discourse to communicate. Ellipsis itself, however, does not refer.

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